

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Petition for Rulemaking: Amendment of) CG RM-11844
Rules Governing Ultra-Wideband Devices)
and Systems)

**ULTRA WIDEBAND ALLIANCE STATEMENT OF SUPPORT
FOR THE
ROBERT BOSCH LLC PETITION
FOR
AMENDMENT OF RULES GOVERNING
ULTRA-WIDEBAND DEVICES AND SYSTEMS**

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1 Introduction

The UWB Alliance is pleased to provide a response in the above-captioned petition for a comprehensive review of Part 15, Subpart F, regulations governing Ultra-Wideband (UWB) devices and systems. The UWB Alliance would like to express support for such a review and revision of the UWB rules.

The UWB Alliance is a leading consensus-based industry alliance promoting UWB technology and interoperability. The Alliance membership has developed innovative products widely used throughout the world. Application of UWB Technology is growing explosively, finding commodity application in the automotive and consumer electronics sectors. With such rapid growth in interest and application, the opportunity for review and revision of the UWB rules is well timed. We appreciate the opportunity to provide these comments to the Commission.

IEEE Std 802.15.4-2015 includes specifications of two UWB Physical Layer (PHY), which have been widely adopted for applications requiring precise ranging and localization, such as RFID, industrial asset tracking, motion detection and surveillance, patient monitoring (fall detection), Industrial robotics, sports tracking, factory automation, stock (animal) health and tracking, bus and train monitoring and communication, and many other applications that require precise near-instantaneous ranging capabilities uniquely enabled by UWB.

The IEEE 802.15 Working Group (WG) is now specifying the next generation of precision ranging capable UWB PHY enhancements. The participation in the development of enhanced ranging includes major consumer electronics and mobile handset makers, with mass market application targets based on UWB capability in mobile devices, vehicles, buildings and other structures.

2 Conservative Rules with Extreme Margins

When the Commission issued the Report and Order establishing the UWB rules in 2002, they characterized the limits and restrictions of Subpart F as “ultra-conservative” and stated that the Commission intended to reconsider many of the restrictions and conditions at a later date based upon industry experience.¹ Commissioner Michael Copps wrote in his statement that this

¹ First report and order, : February 14,2002, clause 1.1 <https://ecfsapi.fcc.gov/file/6513194036.pdf>

“ultra-conservative ultra-wideband step we take today “was at the “extreme (conservative) end of what FCC engineers – the best spectrum engineers in the country – believe necessary”².

There is now extensive industry experience which confirms this characterization by the Commission. UWB has been widely used and proven to cause no harmful interference to other radio services. As noted in the petition, the FCC has acknowledged the extremely low risk of harmful interference by issuing multiple waivers to reduce some of the Subpart F restrictions.

The FCC subsequently provided a means to approve Wide Band devices utilizing UWB techniques operating in the 5925-7250 MHz band in Subpart C, §15.250. This allowed many devices to be approved without the restriction on outdoor utilization, or a requirement for a 10 second acknowledgement to every transmission. Seventeen years of experience with these approved devices has shown no issues of causing harmful interference.

3 Reasonable Caution

The UWB Alliance encourages the Commission to proceed with reasonable caution. Industry experience has demonstrated the ability to share spectrum without causing harmful interference to other spectrum users. We are aware of concerns raised by incumbent spectrum users. Many of those concerns are the same that were raised and addressed in the rulemaking process that produced Subpart F in 2002. We are confident that the requirements of all spectrum users can be met in the rule making process.

We remind all parties that the petition requests that the FCC begin the rulemaking process. If the FCC decides to begin the process, there will be multiple opportunities for input by all stakeholders. Through this proven process the Commission can assemble the relevant information to make informed decisions. We cannot find the answers unless the Commission asks the questions. We urge the Commission to take the next, long overdue step.

4 Support for the Bosch Petition

As the petition points out, the Commission has sanctioned many of the suggested changes via the waiver process. There have been no negative consequences observed from the approved waivers. Adopting by rule, what has been accepted by waiver, will ensure consistent

² Commissioner Copps Feb 14 2002 statement. <https://transition.fcc.gov/Speeches/Copps/Statements/2002/stmj205.html>

implementation thereby reducing uncertainty for commercial entities developing products. This will stimulate further investment in an innovative technology approach that has been proven to share spectrum with other users and thereby increase the virtual size of the valuable radio spectrum resource.

We support normalizing the measurement procedures prescribed in the Part 15 rules with methods noted in the petition. These have been proven practical and validated through use after being approved via the waiver process. The proposed changes would also align test methods with other internationally recognized standards thereby increasing the incentive to develop innovative products with worldwide applicability. This has a direct impact on the motivation to make technological investments by reducing certification costs and greatly increasing markets.

5 Incremental Opportunity

We note that some of the recommendations in the petition would have greater benefit than the petitioner states and would have the effect of enabling a broader range of technologies to utilize the UWB rules. This would apply to both existing techniques as well as leading to the development of new techniques with even better spectral utilization and capability for sharing spectrum. In particular, the recommendation to allow frequency and time diversity to be considered when determining occupied bandwidth would enable existing technologies commonly used for IEEE Std 802.11 based WLAN (aka Wi-Fi) to be adapted to the UWB rules with the addition of frequency agility techniques to meet the bandwidth requirement. Combined with the raised PSD limits suggested, many practical applications of WLAN would be allowed (e.g., a mobile hotspot where minimal radio range is required, such as around a conference table).

Uses such as these and many other usage scenarios requires a great many WLAN devices in a small area. Such applications would benefit from reducing transmit power, and thus interference footprint. The proposed -31dBm PSD level is enough for communication at typical WLAN rates between devices within a few meters of each other. In dense urban environments, this would include a lot of typical WLAN users. Lower power will drastically improve performance of co-located LANs in high density deployments. The ability to access a significant part of 7 GHz of licensed exempt spectrum is a powerful incentive to find innovative solutions.

With these changes, many WLAN applications currently stressing the available spectrum would be able to work in the large amount of spectrum authorized under Subpart F. This is a

practical way to address a significant part of the “spectrum crisis” being experienced by WLAN users without causing the disruption that is threatened by simply authorizing the same high power levels typically used today in other bands.

This is achievable by existing WLAN implementations. There are numerous well-known methods to add frequency diversity (e.g., channel hopping) without changing the signal structure or medium access implementation, (i.e., no changes would be required to silicon). Frequency diversity is a proven technique to enhance coexistence and increase tolerance to interference. It also can reduce interference footprint on other services.

High rate UWB solutions have been proven to obtain the data rates currently sought by WLAN developers with greater power and spectrum efficiency than just adding frequency diversity to 802.11 OFDM. Additionally, there is an opportunity for major innovation that remains compatible with the incremental approach.

Review and revision of the rules for UWB can increase this opportunity for both incremental and major innovation through new technological methodologies.

6 Recommendations

The petition proposes adoption by rule of changes to the process and methods used to test and certify UWB devices which have been approved in multiple waivers. In general, we agree. This will assure consistent application.

The petition requests increasing the in-band power spectral density limits by +10dB. We agree that this may be a positive change. The new limit would enable new applications of UWB without undue risk of interference while making a large amount of currently allocated spectrum available for new uses.

The petition requests allowing frequency/time diversity techniques to be used to meet the minimum bandwidth requirements. We endorse this change.

The petition requests removal of the restriction on fixed outdoor use of UWB. We endorse this change. Many applications for precise real time localization utilize fixed devices in conjunction with mobile devices. Waivers for such systems have been granted for applications such as robotic lawn mowers which safely guide outdoor devices without causing any harmful interference to incumbent users. Consumer applications such as secure access to vehicles and

buildings, as well as high precision real time tracking of transportation assets, personnel and other assets via mobile devices, can be enhanced with the use of fixed devices in outdoor locations.

As noted, some of the changes requested may have broader benefits than stated in the petition. Specifically, changes to allow swept frequency and frequency agility to be used to meet the minimum bandwidth will have the additional benefit of enabling a broad range of technologies to be adapted to the UWB rules. These changes combined with the removal of restrictions on outdoor use and other small changes will expand opportunity and stimulate innovation. This would ultimately result in a greater utility from the spectrum.

We also encourage the Commission to consider alignment with the Part 15.250 wideband rules and international rules for UWB. This can provide better economics in product development and certification processes, which can lead to expanding available spectrum for new uses of UWB (e.g., broadband).

Use of UWB is growing rapidly, with renewed interest and innovation. Reasonable changes can help sustain this growth and stimulate further innovation.

7 Conclusion

Considering the points mentioned above, we therefore respectfully request the Commission to begin rulemaking to revise and update the rules governing UWB operation.

Respectfully Submitted,

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